



Installation and Maintenance Manual

Series 55-LVA

Air operated 2 port / 3 port Valve (Single type)



Marking description: 55-LVA10 and 55-LVA12

II 2G c IIB T6 X Ta 0°C to +50°C
 II 2G c IIB TX X Ta 0°C to +60°C

Group II
 Category 2G
 Suitable for Gas environment (Zone 1, 2)
 Type of Protection "constructional safety"
 Suitable for applications requiring Explosion Group IIB or IIA
 TX marking is dependent on fluid temperature (100°C Max.)
 Special condition 'X' Protect from impacts with ATEX enclosure

Marking description:

55-LVA2#, 55-LVA3#, 55-LVA4#, 55-LVA5#, 55-LVA6# and 55-LVA200

II 2GD c IIB 80°C T6 X Ta 0°C to +50°C
 II 2GD c IIB TX X Ta 0°C to +60°C

Group II
 Category 2GD
 Suitable for Gas (Zone 1, 2) and Dust environment (Zone 21, 22)
 Type of Protection "constructional safety"
 Suitable for applications requiring Explosion Group IIB or IIA
 TX marking is dependent on fluid temperature (100°C Max.)
 Special condition 'X' Protect from impacts with ATEX enclosure

1 Safety Instructions

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

	Caution	Indicates a hazard with a low level of risk, which if not avoided, could result in minor or moderate injury.
	Warning	Indicates a hazard with a medium level of risk, which if not avoided, could result in death or serious injury.
	Danger	Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.

Warning

- The compatibility of equipment is the responsibility of the person who designs the system or decides its specifications. Since the products specified here can be used in various operating conditions, their compatibility with a specific system must be based on specifications or after analysis and/or tests to meet specific requirements.
- **Only trained personnel should operate pneumatically operated machinery and equipment.** The fluid can be dangerous if handled incorrectly. Assembly, handling or maintenance of the system should be performed by trained and experienced personnel.
- **Do not service machinery/equipment or attempt to remove components until safety is confirmed.**

1 Safety Instructions (continued)

- 1) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
 - 2) When equipment is to be removed, confirm the safety processes as mentioned above. Release the fluid pressure and be certain there is no danger from fluid leakage or fluid remaining in the system. Switch off electrical supplies.
 - 3) Before machinery/equipment is re-started, ensure all safety measures are being implemented.
- **Do not use this product outside of the specifications. Contact SMC if it is to be used in any of the following conditions:**
 - 1) Conditions and environments beyond the given specifications, or if the product is to be used outdoors.
 - 2) With fluids whose application causes concern due to the type of fluid or additives, etc.
 - 3) Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
 - 4) An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

1.1 Conformity to Standard

This product is certified to and complies with the following standards:

Non-Electrical Equipment for Potentially Explosive Atmospheres. Part 1 Basic method and requirements	EN13463-1: 2009
Non-Electrical Equipment for Potentially Explosive Atmospheres. Part 5 Protection by constructional safety 'c'	EN13463-5: 2003

1.2 Specific recommendations

Danger

- Protect from impacts using an ATEX enclosure suitable for impacts.

Warning

- Not suitable for Zones 0 and 20.
- Suitable for Zones 1, 2, 21 and 22 (except 55-LVA10 and 55-LVA12).
- 55-LVA10 and 55-LVA12 are suitable for Zones 1 and 2 only.
- Not suitable for applications requiring Explosion Group IIC.
- Suitable for applications requiring Explosion Group IIB or IIA.
- TX marking is dependent on fluid temperature. The maximum surface temperature is 130°C for maximum fluid temperature and 90°C when the fluid temperature does not exceed the maximum ambient temperature.

Caution

- Do not brush or wipe this product to avoid static charge build up. Static charge can cause a spark or ignition source.

Caution

- Ensure that the air supply system is filtered to 5 microns.
- For water: Ensure a filter strainer of about 100 mesh is installed on the inlet side of the piping.
- For chemical fluids: Fluid can crystallize or clot depending on its properties. Leakage will occur when crystallized or clotted component is trapped between the sealing parts. Take measures to clean the valve if necessary.

2 Specifications

2.1 General Specifications

55-LVA10 / 20 / 30

Model	55-LVA10	55-LVA20	55-LVA30
Valve construction	Air-operated 2-port valve Diaphragm type		
Orifice diameter (mm)	Ø2	Ø4	Ø8
Port size	1/8, 1/4	1/8, 1/4	1/4, 3/8
Withstand pressure (MPa)	1.0		
Operating pressure (MPa)	0 to 0.5		
Back pressure (MPa)	N.C./N.O.	0.15 or less	0.3 or less
	Double acting	0.3 or less	0.4 or less
Valve leakage (cm ³ /min)	Zero leakage (with water pressure)		
Pilot air pressure (MPa)	0.3 to 0.5		
Pilot port size	M5	Rc1/8, NPT 1/8	
Max. operating frequency (Hz)	1.0		
Fluid temperature (°C)	Temperature Class T6: 0 to 50 Temperature Class T X: 0 to 100 ⁽¹⁾		
Ambient temperature (°C)	Temperature Class T6: 0 to 50 Temperature Class T X: 0 to 60		
Weight (kg)	Stainless steel	0.12	0.18
	PPS	0.05	0.08
	PFA	-	0.09

Note 1) No freezing.

55-LVA40 / 50 / 60

Model	55-LVA40	55-LVA50	55-LVA60
Valve construction	Air-operated 2-port valve Diaphragm type		
Orifice diameter (mm)	Ø12	Ø20	Ø22
Port size	3/8, 1/2	1/2, 3/4	1
Withstand pressure (MPa)	1.0		
Operating pressure (MPa)	0 to 0.5	0 to 0.4	

Back pressure (MPa)	N.C./N.O.	0.3 or less	0.2 or less
	Double acting	0.4 or less	0.3 or less
Valve leakage (cm ³ /min)	Zero leakage (with water pressure)		
Pilot air pressure (MPa)	0.3 to 0.5		
Pilot port size	Rc1/8, NPT 1/8		
Max. operating frequency (Hz)	1.0		
Fluid temperature (°C)	Temperature Class T6: 0 to 50 Temperature Class TX: 0 to 100 ⁽¹⁾		
Ambient temperature (°C)	Temperature Class T6: 0 to 50 Temperature Class T X: 0 to 60		
Weight (kg)	Stainless steel	0.86	1.67
	PPS	0.32	-
	PFA	0.35	-

Note 1) 0 to 60°C when the diaphragm is NBR or EPR

55-LVA200

Model	55-LVA200
Valve construction	Air-operated 3-port valve Diaphragm type
Orifice diameter (mm)	4
Port size	1/4
Withstand pressure (MPa)	1.0
Operating pressure (MPa)	0 to 0.5
Valve leakage (cm ³ /min)	Zero leakage (with water pressure)
Pilot air pressure (MPa)	0.4 to 0.5
Pilot port size	M5 x 0.8
Max. operating frequency (Hz)	1.0
Fluid temperature (°C)	Temperature Class T6: 0 to 50 Temperature Class T X: 0 to 100
Ambient temperature (°C)	Temperature Class T6: 0 to 50 Temperature Class T X: 0 to 60
Weight (kg)	0.162

2 Specifications (continued)

2.2 Production Batch Codes

- The production batch code printed on the label indicates the month and year of manufacture as in the following table.

Year	2010	2011	2012	.....	2021	2022	2023	.....
	o	P	Q	.....	Z	A	B	.....
Month	o	P	Q	.....	Z	A	B	.....
Jan	oo	Po	Qo	.....	Zo	Ao	Bo	.....
Feb	oP	PP	QP	.....	ZP	AP	BP	.....
Mar	oQ	PQ	QQ	.....	ZQ	AQ	BQ	.....
Apr	oR	PR	QR	.....	ZR	AR	BR	.....
May	oS	PS	QS	.....	ZS	AS	BS	.....
Jun	oT	PT	QT	.....	ZT	AT	BT	.....
Jul	oU	PU	QU	.....	ZU	AU	BU	.....
Aug	oV	PV	QV	.....	ZV	AV	BV	.....
Sep	oW	PW	QW	.....	ZW	AW	BW	.....
Oct	oX	PX	QX	.....	ZX	AX	BX	.....
Nov	oy	Py	Qy	.....	Zy	Ay	By	.....
Dec	oZ	PZ	QZ	.....	ZZ	AZ	BZ	.....

2.3 Dimensions 2-port type

- **Body material: Stainless steel**

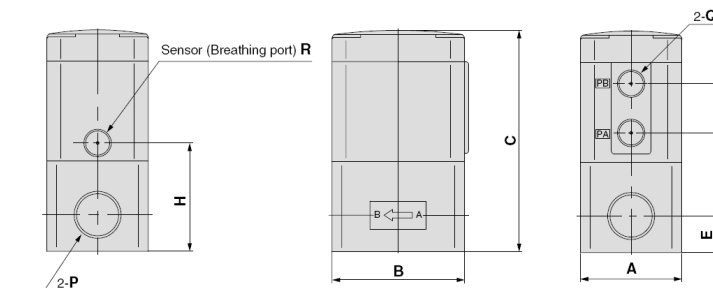


Figure 1

Model	mm						
	A	B	C	E	F	G	H
55-LVA10	20	33	49.5	10	27.5	11	27.5
55-LVA20	30	36	57.5	10	31	13	26
55-LVA30	36	47	77.5	13	42.5	17.5	38.5
55-LVA40	46	60	96	16	54.5	18	47.5
55-LVA50	58	75	84	19	61.5	27.5	55.5
55-LVA60	58	85	130	24	69	27.5	63

Table 1

Model	Ports		
	P	Q	R
55-LVA10	1/8, 1/4	M5 x 0.8	Ø 4.2mm
55-LVA20	1/4, 3/8	1/8	M3 x 0.5
55-LVA30	1/4, 3/8		
55-LVA40	3/8, 1/2		
55-LVA50	1/2, 3/4		
55-LVA60	1	1/8	

Table 2

- **Body material: PPS**

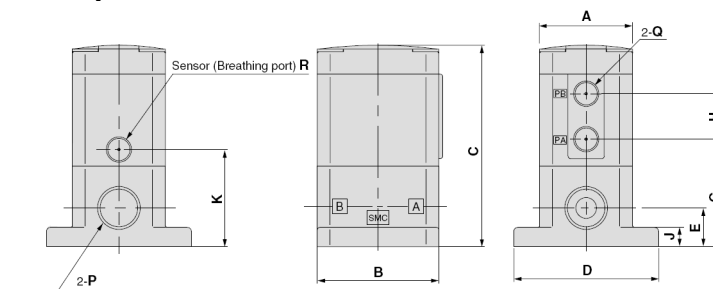


Figure 2

2 Specifications (continued)

Model	mm								
	A	B	C	D	E	G	H	J	K
55-LVA10	20	33	49.5	-	10	27.5	11	-	27.5
55-LVA20	30	36	57.5	44	11	31.5	13	4	26.5
55-LVA30	36	47	77.5	56	15	41.5	17.5	7.5	37.5
55-LVA40	46	60	96	68	22	55	18	8	48

Table 3

Model	Ports		
	P	Q	R
55-LVA10	1/8, 1/4	M5 x 0.8	ø4.2mm
55-LVA20	1/4		M3 x 0.5
55-LVA30	3/8	1/8	1/8
55-LVA40	1/2		

Table 4

Body material: PFA

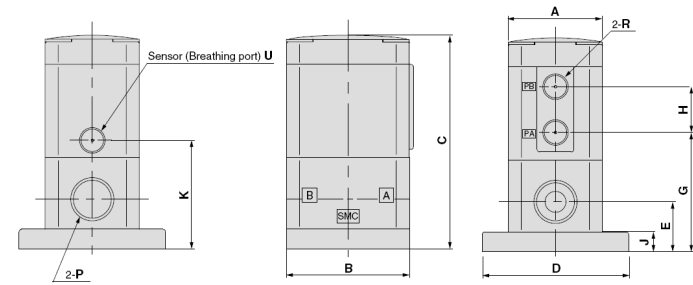


Figure 3

Model	mm								
	A	B	C	D	E	G	H	J	K
55-LVA20	30	36	61	44	14.5	35	13	4	30
55-LVA30	36	47	81.5	56	19	45.5	17.5	7.5	41.5
55-LVA40	46	60	96	68	22	55	18	8	48

Table 5

Model	Ports		
	P	R	U
55-LVA20	1/4	M5 x 0.8	M3 x 0.5
55-LVA30	3/8	1/8	1/8
55-LVA40	1/2		

Table 6

2.4 Dimensions 3-port type

Body material: PFA

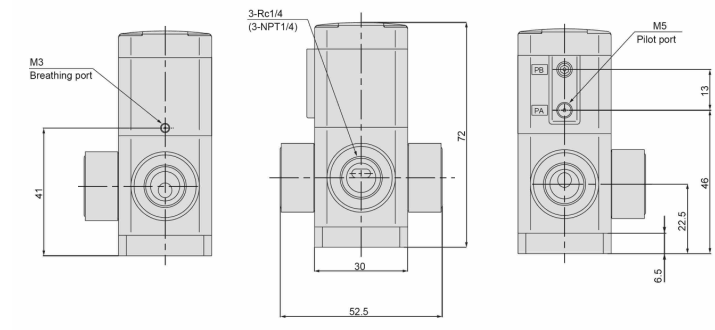


Figure 4

3 Installation

Danger

- Protect valve from impacts.
- The explosive atmosphere should not be allowed to enter the pneumatic circuit, even in the case of expected malfunction.

Warning

- Do not install the product unless the safety instructions have been read and understood.
- If air leakage increases or equipment does not operate properly, stop operation.

3.1 Mounting

- Any mounting position is possible.
- The installation should allow sufficient space for maintenance and inspection activities.
- Avoid sources of vibration, or adjust the distance from the body to a minimum length so that resonance will not occur.
- Painting and coating; Warnings or specifications printed or labelled on the product should not be erased, removed or covered up.
- After mounting is completed, confirm that it has been done correctly by performing a suitable function test.

3.2 Mounting interface 2-port valve

Body material: Stainless steel

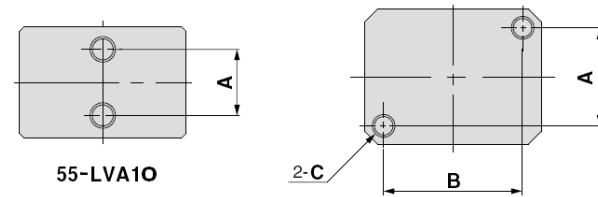


Figure 5

Model	Dimension (mm)		
	A	B	C
55-LVA10	13	-	M5 x 0.8
55-LVA20	22	22	M5 x 0.8
55-LVA30	26	37	M6 x 1.0
55-LVA40	33.5	47.5	M8 x 1.25
55-LVA50	43	60	M8 x 1.25
55-LVA60	43	60	M8 x 1.25

Table 7

Body material: PPS

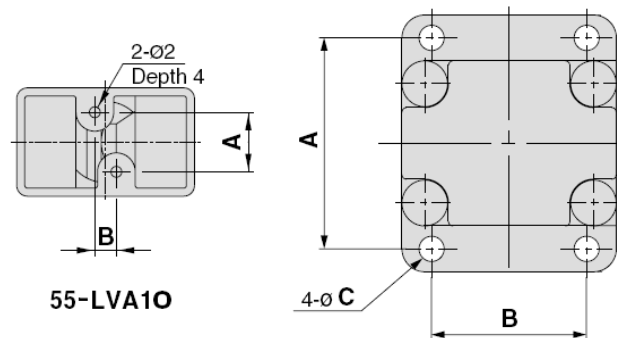


Figure 6

Model	Dimension (mm)		
	A	B	C
55-LVA10	11	4	-
55-LVA20	37	20	ø 3.5
55-LVA30	46	34	ø 5.5
55-LVA40	57	42	ø 5.5

Table 8

3 Installation (continued)

Body material: PFA

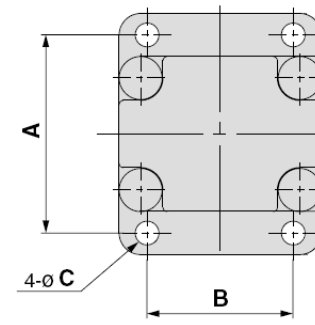


Figure 7

Model	Dimension (mm)		
	A	B	C
55-LVA20	37	20	ø 3.5
55-LVA30	46	34	ø 5.5
55-LVA40	57	42	ø 5.5

Table 9

3.3 Mounting interface 3-port type

Body material: PFA

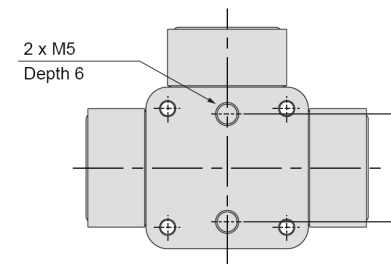


Figure 8

3.4 Tightening torque

- The valve is attached with 2 or 4 mounting screws.
- Tighten mounting screws to appropriate tightening torque shown in Table 10

Valve	Appropriate tightening torque (Nm)		
	Stainless body	PPS body	PFA body
55-LVA10	3 ±0.7 (M5)	0.6±0.1 (M3 tapping)	-
55-LVA20	3 ±0.7 (M5)	0.6 ±0.1 (M3)	0.6 ±0.1 (M3)
55-LVA30	5 ±0.7 (M6)	1.8 ±0.3 (M5)	1.8 ±0.3 (M5)
55-LVA40	12 +3/-1 (M8)	1.8 ±0.3 (M5)	1.8 ±0.3 (M5)
55-LVA50	12 +3/-1 (M8)	-	-
55-LVA60	12 +3/-1 (M8)	-	-
55-LVA200	-	-	3 ±0.7 (M5)

Table 10

3.5 Environment

Warning

- Do not mount in a location where it can be subject to impact.
- Do not use in an environment where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.
- Ensure that the fluid does not touch the external surface of the product.
- Operate within the allowable ambient temperature range. Confirm the compatibility between the products composition materials and the ambient atmosphere.
- Do not use in an explosive atmosphere, except the specified Zones and Explosion Groups. (Refer to "Marking description" at the beginning of this manual)
- The product should not be exposed to prolonged sunlight. Use a protective cover.
- Do not mount the product in a location where it is subject to excessive vibrations.
- Do not mount the product in a location exposed to radiant heat.

3 Installation (continued)

3.6 Piping

Caution

- Before piping is connected, it should be thoroughly blown out with air or washed to remove chips, cutting oil, dust and other debris from inside the piping.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1.5 to 2 threads exposed on the end of the pipe/fitting.
- Install piping so that it does not apply pulling, pressing, bending or other forces on the valve body.
- Do not use metal fittings for piping on taper threads made of resin, as this may cause damage to the threads.
- In applications such as vacuum and non-leak specifications, use caution against contamination of foreign objects and air tightness of fittings.
- Use pilot ports and sensor (breathing) ports as indicated in Table 11

Model	PA Port	PB Port	Sensor port (Breathing port)
N.C.	Pressure	Breathing	Breathing
N.O.	Breathing	Pressure	Breathing
Double acting	Pressure	Pressure	Breathing

Table 11

- If used in a dust atmosphere pipe all breathing ports to a non-explosive atmosphere to prevent ingress of dust and malfunction.
- 55-LVA10 and 55-LVA12 are not suitable for dust atmosphere. They have a non-threaded sensor (breathing) port and cannot be piped to a non-explosive atmosphere.

Body material: Stainless steel

Valve	Threaded Fitting Size		
	Port - P	Pilot port - PA, PB	Sensor port
55-LVA10	1/8, 1/4	M5 x 0.8	ø 4.2
55-LVA20	1/8, 1/4	M5 x 0.8	M3 x 0.5
55-LVA30	1/4, 3/8	1/8	1/8
55-LVA40	3/8, 1/2	1/8	1/8
55-LVA50	1/2, 3/4	1/8	1/8
55-LVA60	1	1/8	1/8

Table 12

Stainless steel body ported tightening torque for fittings

Thread	Tightening Torque (Nm)
1/8	7 to 9
1/4	12 to 14
3/8	22 to 24
1/2	28 to 30
3/4	28 to 30
1	36 to 38

Table 13

Body material: PPS

Valve	Threaded Fitting Size		
	Port - P	Pilot port - PA, PB	Sensor port
55-LVA10	1/8, 1/4	M5 x 0.8	ø 4.2
55-LVA20	1/4	M5 x 0.8	M3 x 0.5
55-LVA30	3/8	1/8	1/8
55-LVA40	1/2	1/8	1/8

Table 14

3 Installation (continued)

PPS body ported tightening torque for fittings

Valve	Thread	Breaking torque (Nm)	Tightening torque (Nm)	Guideline for tightening torque (Number of turns) ⁽¹⁾
55-LVA10	1/8, 1/4	2 to 3	0.5 to 1	2 to 3 turns
55-LVA20	1/4	2 to 3	0.5 to 1	2 to 3 turns
55-LVA30	3/8	6 to 8	2 to 3	3 to 4 turns
55-LVA40	1/2	11 to 14	5 to 7	3 to 4 turns

Note 1) Number of turns when the fitting is screwed into the body with 2 to 3 windings of sealant tape applied to the threads of the pipe.

Table 15

• Body material: PFA

Valve	Threaded Fitting Size		
	Port - P	Pilot port - PA, PB	Sensor port
55-LVA20	1/4	M5 x 0.8	M3 x 0.5
55-LVA30	3/8	1/8	1/8
55-LVA40	1/2	1/8	1/8
55-LVA200	1/4	M5 x 0.8	M3 x 0.5

Table 16

PFA body ported tightening torque for fittings

Thread	Tightening Torque (Nm)
1/8	0.6 to 0.9
1/4	0.8 to 1.2
3/8	1.0 to 1.6
1/2	1.5 to 2.0

Table 17

• Pilot and sensor ports (all valves)

Tightening torque for pilot and sensor ports

Thread	Appropriate tightening torque (Nm)
M3	By hand + 1/4 turn with a wrench
M5	By hand + 1/6 turn with a wrench (1/4 turn for miniature fittings)

1/8	0.8 to 1.0
-----	------------

Table 18

4 Settings

4.1 Flow rate adjuster

- To adjust the flow rate for valves with flow rate adjustment, open gradually starting from the fully closed condition. Ensure lock nut is loosened.
- Opening is accomplished by turning the adjustment knob counter-clockwise.
- Do not apply excessive force to the adjustment knob when approaching the fully open or closed state. This may result in deformation of the orifice sheet surface or damage to the threaded part of the adjustment mechanism.
- Once the required flow rate is achieved, the adjuster can be locked in position by tightening the lock nut in a clockwise direction.
- The product is supplied in the fully closed position.
- The valve may vibrate if operated at very low flow rates, depending on the operating conditions. Therefore, review the flow rate, operating pressure and piping conditions.

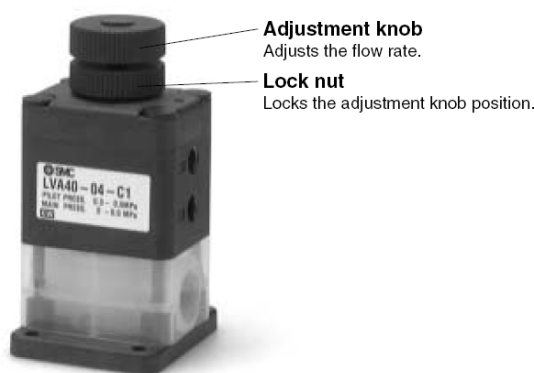


Figure 9

4 Settings (continued)

4.2 Indicator

- Valves with indicator have a mechanical indicator to indicate when the valve is open.
- The indicator shows blue when the valve is open

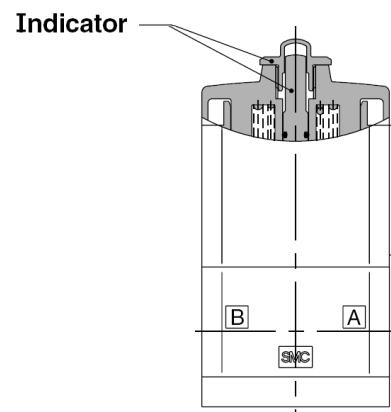


Figure 10

5 Circuit symbols

Valve	Valve type
	N.C.

	N.O.	
	Double Acting	
LVA with By-Pass	N.C.	
	Double Acting	
	N.C.	
	Double Acting	

Table 19

6 How to Order

Refer to the catalogue for this product.

7 Outline Dimensions (mm)

Refer to the catalogue for this product.

8 Maintenance

Warning

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- Maintenance should be performed in accordance with the procedures in the instruction manual. Incorrect handling can cause damage or malfunction of machinery and equipment, etc.
- Before removing equipment or compressed air supply/exhaust devices, shut off the air and power supplies, and exhaust compressed air from the system. Further, when restarting equipment after remounting or replacement, first confirm safety and then check the equipment for normal operation.
- Perform work after removing residual chemicals and carefully replacing them with DI water or air, etc.
- Do not disassemble the product. Products which have been disassembled cannot be guaranteed. If disassembly is necessary, contact SMC.
- In order to obtain optimum performance from valves, perform periodic inspections to confirm that there are no leaks from valves or fittings.
- Flush drainage from filters regularly.
- After a long period of non-use, perform a test before beginning regular operation.

9 Limitations of Use

Danger

- Do not exceed any of the specifications laid out in section 2 of this document or the specific product catalogue.

9.1 Fluid

- Operate after confirming the compatibility of the product's component materials with fluids, using the checklist of the LVA catalogue. Contact SMC for details or fluids other than those in the checklist.
- Since static electricity may be generated depending on the fluid being used, implement suitable countermeasures.

9.2 Pilot air

- Use clean air.
- Do not use compressed air which includes chemicals, synthetic oils containing organic solvents, salt or corrosive gases, etc., as this may cause damage or malfunction.
- Install air filters.
- Install an air dryer or after cooler.
- Compressed air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air drier or after cooler.
- If excessive carbon powder is seen, install a mist separator on the upstream side of the valve. If excessive carbon powder is generated, it may adhere to the inside of the valve and cause malfunction.

9.3 Water hammer

- Water hammering may occur depending on the fluid pressure conditions.
- In most case, improvement is possible by adjusting the pilot pressure with a speed controller. Review the flow rate, pressure and piping conditions.

9.4 Valve with PTFE diaphragm

- Valves with PTFE diaphragm may have a leakage of 1cm³/min (when pressurised) for gases such as N₂ and air.

10 Contacts

AUSTRIA	(43) 2262 62280-0	LATVIA	(371) 781 77 00
BELGIUM	(32) 3 355 1464	LITHUANIA	(370) 5 264 8126
BULGARIA	(359) 2 974 4492	NETHERLANDS	(31) 20 531 8888
CZECH REP.	(420) 541 424 611	NORWAY	(47) 67 12 90 20
DENMARK	(45) 7025 2900	POLAND	(48) 22 211 9600
ESTONIA	(372) 651 0370	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	ROMANIA	(40) 21 320 5111
FRANCE	(33) 1 6476 1000	SLOVAKIA	(421) 2 444 56725
GERMANY	(49) 6103 4020	SLOVENIA	(386) 73 885 412
GREECE	(30) 210 271 7265	SPAIN	(34) 945 184 100
HUNGARY	(36) 23 511 390	SWEDEN	(46) 8 603 1200
IRELAND	(353) 1 403 9000	SWITZERLAND	(41) 52 396 3131
ITALY	(39) 02 92711	UNITED KINGDOM	(44) 1908 563888

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